Space Weather Forecast

Issued on Friday, 26 August 2022 at 12:12 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Minor/Moderate radio blackouts from Moderate-class X-ray flares likely.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was moderate, with frequent common-class X-ray flares in the period, and with peak flare activity of a low-end moderate-class X-ray flare recorded at 25/1951UTC, 25/2327UTC and 26/1055UTC. All of these flares arose from a growing and magnetically complex sunspot region in the southeast. There was another notable sunspot in the southwest which has undergone a similar lifecycle at a similar solar latitude. This group appears more complex, at least on paper, however peak X-ray activity was lower at mid common-class, with a probable Coronal Mass Ejection (CME) emitted at 26/0629UTC. Corroborating satellite imagery is not yet available for analysis.

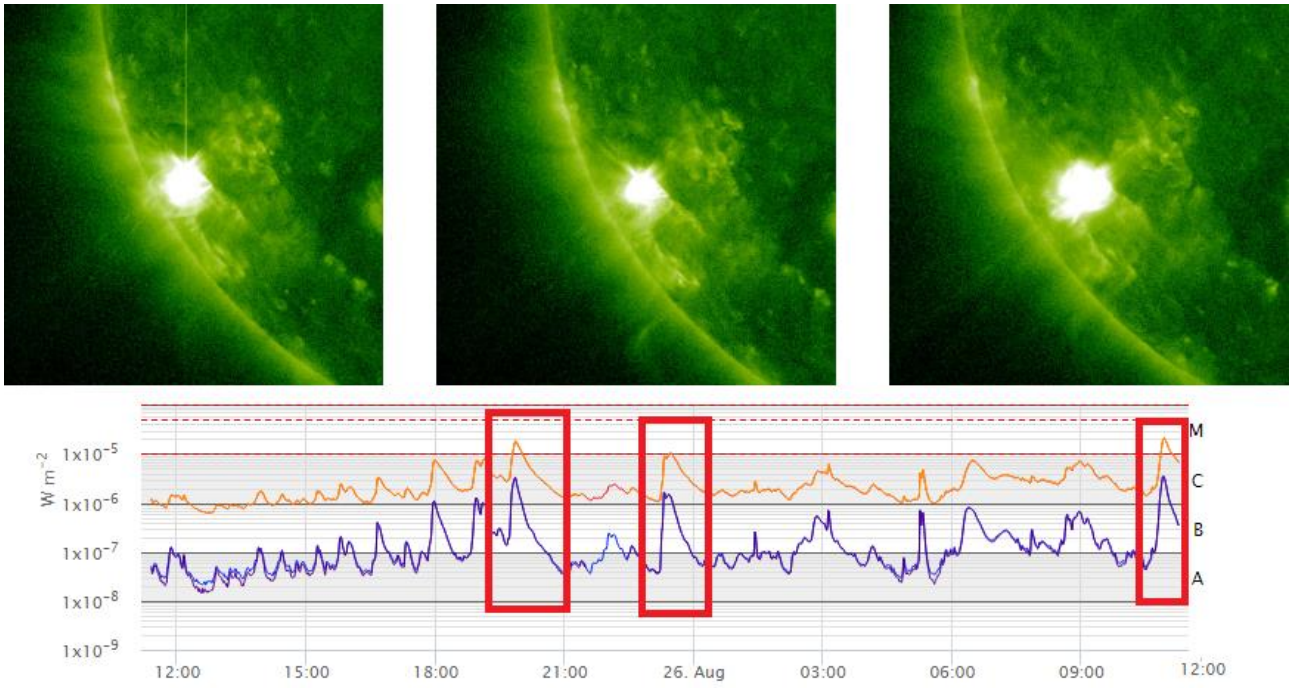

Figure 1: False-colour extreme UV imagery of the three moderate-class X-ray flares in the period, all arising from a sunspot region on the southeast of the Sun. Also shown is the X-ray trace at a near-Earth satellite, with the flares themselves boxed in red.

As for other potential CME-producing events in the period, there was a minor possible 'disappearing filament' in near infrared ground-based observatory imagery around 25/1530UTC, however this could not be reconciled with any ejecta, and no Earth-bound CMEs were therefore

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thought to be in evidence.

Solar Wind / Geomagnetic Activity: The solar wind was characteristic of a slow solar wind regime, with the speed showing an overall decline from early highs, but remaining within background levels. Both the number of particles and their associated magnetic fields were both within normal parameters for the same period. The net result of the above solar wind measures was for provisionally quiet geomagnetic indices throughout.

Energetic Particles / Solar Radiation: No solar radiation storms have been observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Further Moderate-class flares are likely until the new UTC week, with a daily slight chance of a Strong-class flare, with a slight decrease on Monday 29 August the result of one of the main sunspot's departures from the Earth-facing side of the Sun, although its main compatriot in the southeast should remain present throughout (barring development). No new regions of note are due over the eastern solar horizon.

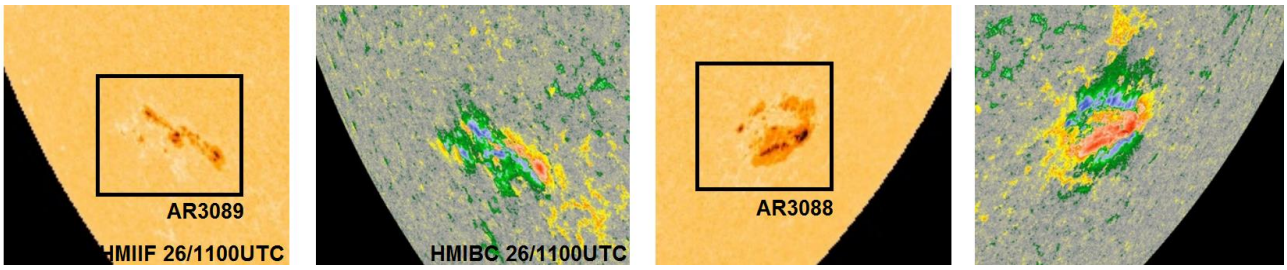

Figure 2: Visible and magnetic imagery of the two largest and most complex sunspot regions on the Sun at present, as of 26/1100UTC.

Solar Wind / Geomagnetic Activity: No Earth-directed CMEs currently feature in this forecast.

The 'coronal hole'-based forecast is of lower than average confidence, but also probable lower than average consequence. Geomagnetic activity is expected to be mostly quiet, with minor influence from a fast wind possible on day two, Saturday 27 August, but probably sub-G-scale (i.e. below Minor Storm G1). This should ease before a possible rise to a peak of a slight chance of a G1/Minor Storm on day four - should a second fast wind follow (Monday 29 August).

Energetic Particles / Solar Radiation: The risk of solar radiation storms of S1 or greater should remain near Background levels but carries a daily slight chance of S1 or greater, due to the presence of the aforementioned complex sunspots.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	1	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	60	60	50
Very Active	R3 to R5 X	No	10	10	10	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	10	10
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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